

इंटरनेट

मानक

### Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 5501 (1969): Specification for pneumatic tyred roller  
[MED 18: Construction Plant and Machinery]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



**“पुनर्पुष्ट १९९३”**

**“REAFFIRMED 1993”**

**IS : 5501 - 1969**  
**( Reaffirmed 1988 )**

***Indian Standard***

**SPECIFICATION FOR  
PNEUMATIC TYRED ROLLER**

**( Second Reprint SEPTEMBER 1991 )**

**UDC 625.7.084**

**© Copyright 1970**

**BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

# Indian Standard

## SPECIFICATION FOR PNEUMATIC TYRED ROLLER

Construction Plant and Machinery Sectional Committee, BDC 28

### Chairman

LT-GEN R. A. LOOMBA

### Representing

Engineer-in-Chief's Branch, Army Headquarters

### Members

SHRI B. D. AHUJA	National Buildings Organization, New Delhi
SHRI A. V. JAIN (Alternate)	
SHRI ARDAMAN SINGH	Beas Project
SHRI N. S. GILL (Alternate)	
SHRI CHANDRA MOHAN	Central Mechanical Engineering Research Institute (CSIR), Durgapur
SHRI R. K. MUKHERJEE (Alternate)	
SHRI M. O. DANANI	Khandelwal Udyog Ltd, Bombay
SHRI J. DATT	The Concrete Association of India, Bombay
SHRI Y. K. MEHTA (Alternate)	
DIRECTOR (P & M)	Central Water & Power Commission
BRIG N. B. GRANT	Engineer-in-Chief's Branch, Army Headquarters
SHRI H. S. SATHYANARAYANA (Alternate)	
JOINT DIRECTOR (WORKS)	Railway Board (Ministry of Railways)
JOINT DIRECTOR (CIV ENGG) (Alternate)	
SHRI B. KARMAKAR	Hindustan Construction Co Ltd, Bombay
SHRI S. Y. KHAN	Killick, Nixon & Co Ltd, Bombay
SHRI J. S. ANAND (Alternate)	
SHRI S. KRISHNAN	Directorate General of Supplies & Disposals
SHRI N. KUMAR	Heatly and Gresham Ltd, Calcutta
SHRI V. GULATI (Alternate)	
SHRI M. R. MALYA	Burmah-Shell Oil Storage & Distributing Co of India Ltd, Bombay
DR B. S. BASSI (Alternate)	
MAJ-GEN O. M. MANI	Bharat Earth Movers Ltd, Bangalore
SHRI H. SRINIVASIAH (Alternate)	
BRIG M. N. PATEL	Ministry of Defence (R & D)
LT-COL N. C. GUPTA (Alternate)	
SHRI Y. G. PATEL	Builders Association of India, Bombay
SHRI H. J. SHAH (Alternate)	
SHRI D. M. PRASAD	William Jacks & Co Ltd, Calcutta
SHRI G. K. SETHI (Alternate)	
SHRI S. K. SINHA	Directorate General of Technical Development
SHRI B. C. SRIVASTAVA	Central Building Research Institute (CSIR), Roorkee
SHRI J. P. KAUSHIK (Alternate)	

(Continued on page 14)

**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

( Continued from page 1 )

<i>Members</i>	<i>Representing</i>
SUPERINTENDING ENGINEER, DELHI CENTRAL ELECTRICAL CIRCLE No. III EXECUTIVE ENGINEER ( ELECTRICAL ), MECHANICAL & WORKSHOP DIVISION ( <i>Alternate</i> )	Central Public Works Department
PROF C. G. SWAMINATHAN	Central Road Research Institute ( CSIR ), New Delhi
SHRI N. H. TAYLOR	Recondo Private Ltd, Bombay
SHRI T. H. PESHORI ( <i>Alternate</i> )	
SHRI P. K. THAKUR	Roads Wing ( Ministry of Transport & Aviation )
SHRI G. V. CHELLAM ( <i>Alternate</i> )	
SHRI N. S. VISWANATHAN	Marshall Sons & Co Mfg Ltd, Bombay
SHRI R. NAGARAJAN, Director ( Civ Engg )	Director General, ISI ( <i>Ex-officio Member</i> )

*Secretary*

SHRI Y. R. TANEJA  
Deputy Director ( Civ Engg ), ISI

# *Indian Standard*

## SPECIFICATION FOR PNEUMATIC TYRED ROLLER

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 2 December 1969, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Pneumatic tyred rollers are either self propelled or are operated with the help of a towing vehicle and are mainly employed for the compaction of fine grained soils and closely graded sands. They are also used for the compaction of asphalt surfacing, shallow lift subgrade, gravel and stabilized base, hot mix and cold mix surfaces and seal or armour coating. For fine grained cohesive soils, they give good performance when the soil has the moisture content about 2 to 4 percent below the plastic limit.

**0.3** This standard contains clause **13.2** which permits the purchaser to use his option for selection to suit his requirements.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

### 1. SCOPE

**1.1** This standard lays down the requirements for material, size, design, construction and performance of the towed pneumatic tyred rollers of the following types:

- a) Wobble wheeled pneumatic tyred roller, and
- b) Onions pneumatic tyred roller.

---

\*Rules for rounding off numerical values (*revised*).

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Wobble Wheeled Pneumatic Tyred Roller**—A roller with hollow open topped box body mounted on a number of low pressure pneumatic tyred wheels, the number of wheels varying from nine to thirteen. The wheels are mounted in two lateral rows, one under the front and one under the rear end of the body with rear row having one wheel more than those in the front. The front wheels are staggered to cover the gaps in the rear row so that the whole width of the ground traversed by the roller is covered by wheel treads. The wheels are mounted in pairs with the exception of the centre wheel of the rear row and each pair of wheels is on its own single axle which is pivoted at its centre and arranged in such a manner that the wheels can oscillate to accommodate themselves to the unevenness of the ground.

NOTE—The rocking or wobbling motion, resulting from thisty pe of suspension, kneads the soil and under most conditions produces a smooth compacted surface.

**2.2 Onions Pneumatic Tyred Roller**—A roller made up of a number of units, each unit consisting of a large pneumatic tyred wheel inflated to high pressure and carrying its own ballast box which can be loaded to the ultimate strength of the tyre.

## 3. DESIGNATION OF SIZES

**3.1** The size of a wobble wheeled pneumatic tyred roller shall be designated by the weight of the roller fully ballasted to its maximum capacity. The size of the onions pneumatic tyred roller shall be designated by the number of units (that is the number of wheels) and the capacity of each unit in litres.

## 4. SIZES

**4.1** Wobble wheeled pneumatic tyred rollers shall be of the following sizes:

- a) 10 tonnes, and
- b) 20 tonnes.

**4.2** Onions pneumatic tyred rollers shall be of the following sizes:

- a) 4—2 100, and
- b) 4—4 200.

## 5. MATERIALS

**5.1** Material used for the construction of the roller shall conform to the relevant Indian Standards. However, the following general specifications are given, other alloys or materials of equivalent properties may also be used if they meet the technical requirements and conform to the appropriate requirements of the relevant Indian Standard.



**5.1.1 Steel Sections, Bars and Plates** — These shall conform to IS : 226-1969\*.

**5.1.2 Mild Steel Sheets** — These shall conform to IS : 1079-1968†.

**5.1.3 Steel Castings** — These shall be of suitable grade conforming to IS : 2707-1964‡.

**5.1.4 Carbon Steel Components** — These shall be of suitable class conforming to IS : 2004-1962§.

**5.1.5 Grey Iron Castings** — These shall be of suitable grade conforming to IS : 210-1962||.

**5.1.6 Rivet Bars** — These shall conform to IS : 1148-1964¶.

**5.1.7 Springs** — These shall be manufactured from suitable grade of wire conforming to IS : 4454-1967\*\*.

## 6. CONSTRUCTION

**6.1** The construction of the pneumatic tyred roller in general shall be strong, robust and capable of withstanding continuous strain likely to be imposed during operation over soft ground at speed up to 8 km/h and on hard grounds at speed up to 40 km/h.

**6.2** The main frame of the roller shall be made of structural steel with deep section rolled steel channels or other sections welded, cross braced and stayed to form a rigid unit to ensure perfect alignment and transmission throughout the life of the roller.

**6.2.1** The frame for wobble wheeled roller shall carry the front axles and the draw bar, and shall pivot freely from the underside of the body, the height of the towing eye being adjustable to suit different towing vehicles.

**6.3** Onions pneumatic tyred roller shall consist of four units yoked together side by side and capable of being towed by a suitable tractor or other suitable towing vehicle. Each unit shall be hinged to the yoke at the front so that it is free to move in a vertical arc. At the back each unit shall be connected to the yoke by two long compression springs one above and one below the yoke to damp excessive oscillation on rough ground.

\*Specification for structural steel ( standard quality ) ( *fourth revision* ).

†Specification for hot rolled carbon steel sheet and strip ( *second revision* ).

‡Specification for carbon steel castings for surface hardening.

§Specification for carbon steel forgings for general engineering purposes.

||Specification for grey iron castings ( *revised* ).

¶Specification for rivet bars for structural purposes ( *revised* ).

\*\*Specification for steel wires for cold-formed springs.

Rubbing strakes shall be provided between the units to control any sideways movement. Each unit shall be mounted independently so that it is free to move up and down, and the roller can work over uneven ground while exerting a uniform pressure over the working lane.

**6.4** All parts of the roller requiring frequent replacement or constant attention or periodic servicing shall be easily accessible with minimum dismantling of fittings or parts.

**6.5** The parts, which are exposed to atmosphere and are liable to become defective due to dust, shall be covered.

## **7. BALLASTING**

**7.1** Body of the roller shall be so designed that it shall carry ballast of any sort (such as sand, stone, iron, etc.) available at site in order to increase the weight of the rollers.

**7.2** In onions type rollers, three separate compartments shall be made on each unit. Out of three compartments, two shall be deep and of equal size mounted in front of and behind the wheel respectively and shall be equipped with hopper doors for easy unloading. Third compartment shall be smaller and shallow with removable floor and situated over the wheel. The central compartment shall be ballasted only when the maximum load is required.

## **8. WEIGHT DISTRIBUTION**

**8.1** Both front and the rear wheels shall be loaded equally by putting ballasts.

## **9. WHEELS**

**9.1** In wobble type pneumatic tyred roller, four wheels shall be provided in front and five at the rear side of the roller. In the case of onions type, four wheels shall be provided.

**9.2** Tyres with four ply or above rating of suitable size to withstand the fully ballasted weight of the roller shall be provided. Tyres pressure shall be as in Table 1.

**NOTE** — The performance of a pneumatic tyred roller depends on the tyre inflation pressure and the area of contact between the tyres and the ground. The actual used pressure will depend on the amount of ballast carried and the degree of compaction required. In order to get even compaction and a smooth finish, care should be taken to see that all tyres are inflated to the same pressure.

**TABLE 1 RECOMMENDED TYRE PRESSURE**

( Clause 9.2 )

SL No.	TYPE OF PNEUMATIC ROLLER	SIZE	TYRE PRESSURE ( kg/cm <sup>2</sup> )
i)	Wobble wheel	10 tonnes	1 to 2
ii)	Wobble wheel	20 tonnes	2 to 8.5
iii)	Onions	4 — 2 100	5.75
iv)	Onions	4 — 4 200	6.25 } at maximum load

**9.3** In case of wobble type pneumatic roller, the wheels shall be mounted in pairs, with the exception of centre wheels of the rear row. Each pair of wheels shall be on its own single axle pivoted at its centre and arranged in such a manner that the wheels may oscillate to accommodate themselves to unevenness of the ground and move in a rocking and wobbling motion.

**9.4** Largest capacity wheel bearings to accommodate the thrust of maximum ballasted load shall be provided.

## 10. ENVIRONMENTAL CONDITIONS

**10.1** The roller shall operate satisfactorily without damage to any component when working under the following atmospheric conditions:

- a) *Temperature* — Any temperature between  $-10^{\circ}\text{C}$  and  $60^{\circ}\text{C}$ .
- b) *Humidity* — 100 percent relative humidity at any temperature up to  $27^{\circ} \pm 2^{\circ}\text{C}$  ambient.
- c) *Wind Velocity* — Up to 120 km/h.
- d) *During Dust Storms*.

**10.1.1** The roller shall not suffer any damage to any component if kept idle under the above mentioned atmospheric conditions.

**10.2 Gradient** — Rollers of all sizes shall be capable of operating on a gradient of 1 in 5.

## 11. TURNING CIRCLE RADIUS

**11.1** The roller shall be capable of being operated within the minimum outside turning circle radius of 7 m.

## 12. WATER SPRINKLING

**12.1** Water sprinkling system shall be provided for all wheels with separate control for each row of wheels.

**12.2** Water tank having adequate capacity shall be provided to feed the sprinklers for at least four hours.

**12.3** Tank shall be made of heavy gauge steel and painted with anti-corrosive paint.

### **13. ACCESSORIES**

**13.1** Individual flexible tire or nylon scarifiers and scraper blades shall be provided on all wheels.

**13.2** If so desired by the purchaser, lights shall be provided at the front and the rear end of the roller to operate it during night.

**13.3** Suitable awning shall be provided to protect the operator from sunny, cold and rainy weather.

### **14. LIFTING AND TOWING ARRANGEMENT**

**14.1** The roller shall be provided with suitable means for towing.

**14.2** The roller shall be fitted with suitable means for lifting by slings and crane.

### **15. LUBRICATION**

**15.1** Adequate lubrication of all moving parts shall be provided keeping the maintenance schedule as simple as possible.

### **16. SAFETY REQUIREMENTS**

**16.1** Safety guards for moving parts shall be provided.

**16.2** The roller shall be provided with suitable means to show presence of the roller during night time for other vehicles.

### **17. TOOLS AND INSTRUCTION MANUALS**

**17.1** A strong tool box with lock and key containing the necessary tools for normal running adjustments and lubrication together with instruction manual and an inventory of the tools shall be provided and fixed to the roller.

### **18. MARKING**

**18.1 Rating Plate** — Each roller shall have a rating plate firmly attached to some part which shall not be easily removable. The plate shall have clearly marked on it the following information:

- a) Manufacturer's name and address;
- b) Machine reference number;

- c) Size of the roller;
- d) Year of manufacture;
- e) Effective width of wheels and rolls;
- f) Diameter of wheels and rolls;
- g) Contact area and contact pressure under the rolls with and without ballast (maximum load); and
- h) Draw bar pull on sandy and clayey soils at different working speeds, and the recommended horse power of the towing vehicle.

**18.1.1** The pneumatic tyred roller may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

# BUREAU OF INDIAN STANDARDS

## Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 331 01 31, 331 13 75

Telegrams: Manaksanstha  
( Common to all Offices )

## Regional Offices:

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	{ 331 01 31 331 13 75
*Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	{ 2 18 43 3 16 41
Southern : C. I. T. Campus, MADRAS 600113	{ 41 24 42 41 25 19 41 29 16
†Western : Manakalaya, E9 MIDC, Marol, Andheri ( East ), BOMBAY 400093	6 32 92 95

## Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	{ 2 63 48 2 63 49
‡Peenya Industrial Area 1st Stage, Bangalore Tumkur Road BANGALORE 560058	{ 38 49 55 38 49 56
Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, BHOPAL 462003	6 67 16
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
53/5, Ward No. 29, R.G. Barua Road, 5th Byelane, GUWAHATI 781003	3 31 77
5-8-56C L. N. Gupta Marg ( Nampally Station Road ), HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	{ 6 34 71 6 98 32
117/418 B Sarvodaya Nagar, KANPUR 208005	{ 21 68 76 21 82 92
Patliputra Industrial Estate, PATNA 800013	6 23 05
T.C. No. 14/1421, University P.O., Palayam TRIVANDRUM 695035	{ 6 21 04 6 21 17

## Inspection Offices ( With Sale Point ):

Pushpanjali, First Floor, 205-A West High Court Road, Shankar Nagar Square, NAGPUR 440010	2 51 71
Institution of Engineers ( India ) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35

\*Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, Calcutta 700072

†Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400007

‡Sales Office in Bangalore is at Unity Building, Narasimharaja Square, Bangalore 560002